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*Historical influence
of the medical profession.
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**HISTORY OF MEDICINE
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Lothrop Draper.

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Portrait by Alexander, 1870

John D. Draper.

JOHN D. DRAPER, 1811-1882

ASTROPHYSICIAN, ASTRONOMER, AND PHOTOGRAPHER

THE
HISTORICAL INFLUENCE
OF THE
MEDICAL PROFESSION.

AN ANNIVERSARY DISCOURSE

DELIVERED BEFORE THE

NEW YORK ACADEMY OF MEDICINE,

DECEMBER 10, 1863.

BY

JOHN WILLIAM DRAPER, M.D., LL.D.,

PROFESSOR OF CHEMISTRY AND PHYSIOLOGY IN THE UNIVERSITY OF NEW YORK.

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VIA AIR

ANNIVERSARY DISCOURSE.

MR. PRESIDENT AND FELLOWS OF THE NEW YORK ACADEMY
OF MEDICINE :

Our profession has had a recognised existence in Europe for nearly twenty-three hundred years. Among its great men have been those who were the intimate, often the invisible counsellors of emperors, kings, sultans, popes; of the personages who have swayed the destinies of the civilized world, and made it what it is.

Occupied with the anxieties and responsibilities of his daily life, the physician is too prone to think that the exercise of his influence is limited to the little circle of individuals who fall under his immediate charge. He sees that their health, their happiness, their existence often depend upon him, and, not without excusable pride, finds satisfaction in the successful discharge of his duties. He recounts to himself, perhaps also to others, disease overcome in so many cases, life prolonged in so many. As a good citizen of the world, he completes his personal task, giving himself no concern how far his power may have imperceptibly spread.

Now, I intend this evening to lead you to the con-

sideration of such neglected influences, not so much, however, those exerted by the individual as by the aggregate of all physicians—the medical profession. On many occasions, when even the fate of nations and continents was concerned, their thoughts and their actions have determined the event.

At the so-called restoration of learning in Europe—so-called, for that cannot be restored which has never before existed—the social condition presented a very singular appearance. A belief in the marvellous, the supernatural, pervaded all except the highest ranks. There were fairies in the moonshine, ghosts in the darkness, apparitions in the twilight, goblins in the kitchen, spectres in the garret. Along with these spiritual folk, whose unwelcome presence could not be contemplated without dread, were others of a more tangible but perhaps not of a less awful kind—the old crone who passed for a witch, the mis-shapen dwarf for a familiar of Satan, the wandering vagabond who made a living out of the terrors of the community for a necromancer, and, strange to say, conspicuous in this evil list, the doctor, who was always a Jew.

In the eyes of that generation, the Jew was a fearful and hated man. He had the faculty of amassing wealth mysteriously. He could transport it invisibly from one nation to another, in a manner incomprehensible to people, from whom he kept his secret invention of bills of exchange. The red-handed baron, who with his banditti had lain in wait for a passing caravan, went home to his fastness without any Israelitish gold. No Hebrew followed the

plough, not one was seen at the forge. He was where quick money might be made. He was buying, selling, lending, always amassing. His cosmopolitan habits added not a little to the mystery. The Jew of London and Paris knew very well what was going on at Venice, nay, even in Egypt and in Syria—places which in popular apprehension were somewhere on the confines of the world.

If that was the character of the trading Jew, the Jew who was a doctor was ten-fold more sinister. There was nothing too stupendous for him. It was affirmed of Zedekias, the physician of Charles the Bald, that in presence of the whole court he eat up a wagon, with its load of hay, and also the horses and driver. All the world believed it. No little weight was given to such public opinions by the fact that every person who was rich enough and powerful enough kept stealthily in his palace a Hebrew physician. Even the Sovereign Pontiff himself was often known to indulge in that contraband and excommunicated luxury.

All the physicians of Europe were then Jews. They affiliated with the highest social ranks, they kept aloof from the lower. Social seclusion is public mystery. Over a community who devoutly believed in the curative efficacy of relics, who flocked to shrines in their bodily infirmities, these marvellous men exercised a surprising power. The shrine could cure by miracle, but the Jew could cure by something more miraculous than that.

This mysterious profession, who thus in the midst of Christian communities kept up an Asiatic life, and

silently infused their ideas among all with whom they came in contact, issued from two foci—one at Salerno, in Italy; one at Montpellier, in France. At these places there were medical colleges, carried on very much in the manner that medical colleges are now. The old proverb says, "Birds of a feather flock together." In the libraries of these colleges half the books were Hebrew, and the other half Arabic.

Let us look at the shelves of Salerno. As might be expected, there are Arabic translations of the works of Hippocrates, Galen, Celsus; Hebrew copies of the treatise on fevers by Rabbi Solomon Ben Isaac; the Pandects of Aaron of Alexandria, who first described the small-pox; the books of Judah of Fez, and Amram of Toledo. Conspicuous among the rest are the volumes of that eagle of doctors, as his compatriots delighted to call Rabbi Moses Ben Maimon, known among the uncircumcised all over Europe as Maimonides. We can find appropriateness in his "Poisons and Antidotes," in his "Medical Aphorisms," in his "Preservation of Health." Not so, however, with his "Teacher of the Perplexed." It is a theological work. We thumb over a few pages, to see what it is about, and close it with the hope that its author, who was physician to the great Sultan Saladin, may not lead his readers out of perplexity into something that is a good deal worse. Again, here are the works of Ben Tybbon, he discusses the causes that prevent the waters of the sea from encroaching on the dry land: so geology had already begun. Here also is the "Cyclopedia of Avicenna." It is in twenty volumes, a worthy fore-

runner of the "Britannica." Along with it are his books on health and remedies, his canons of physic. We dip at chance into some of his pages, and stumble on a chapter on the Origin of Mountains. He appreciates the modern geological doctrines of the disintegration of rocks and denudation.

So it was a miscellaneous learning which these Jews and Arabs cultivated; a part of it was of a kind that perhaps did them more harm than good. If we have any doubt on that point, let us look at the character of some of the patrons of Salerno, especially at the Emperor Frederick II. Institutions may be judged of by their fruits. It is a trite remark that history repeats itself; and what Victor Emmanuel is trying to do in our day, Frederick was attempting in those times. He was struggling for the unity of Italy, to give it one government, one language. His successor has encountered the same stumbling-block that arrested his progress. Far in advance of his age, "he instituted representative parliaments, enacted the system of wise laws, asserted the principle of equal rights and equal burdens, and the supremacy of the law over all. He provided for the toleration of all professions, emancipated all the serfs in his domains, instituted cheap justice for the poor, forbade private war, regulated commerce, profitably laying down some of those great principles which only in our time have been finally received as true, collected large libraries, caused to be translated such works as those of Aristotle and Ptolemy, built menageries for natural history, founded in Naples a university, made provision for the education of pro-

missing but indigent youths. All over the land splendid architectural triumphs were created. Under him the Italian language first rose above a patois. Sculpture and painting and music were patronized.”*

But—and this is of chief interest to us—he lived in intimate friendship with the Sultan of Egypt, who was perpetually sending him philosophers, and doctors, and objects of natural history, and books. It had been well if the thing had ended here; but to these less innocent gifts were added—an occasional bevy of dancing-girls, or a choice beauty from the harems of Cairo. We are told of the exquisite complexion, the flowing ringlets, the faultless figure of some of these miscreant ladies. Their eyes were made of liquid darkness, says one—a graphic and happy expression.

From Salerno let us turn to Montpellier. The Alps and the Pyrenees conjointly watch over it, the Mediterranean is close by. In reputation it almost equalled its ancient Italian rival. But institutions, if they impart a tincture to the communities in which they are placed, reciprocally gather one from them. The pretty French town followed the fashions of the Spanish Moors, for these were the times when Spain was under the Mohammedan rule. If Salerno was influencing Europe through its scientific ideas, Montpellier was doing the same in a literary direction. From Spain across the Pyrenees “literary, philosophical, and military adventurers were perpetually passing, and thus the luxury, the taste,

* Draper's Intel. Develop. of Europe, p. 376.

and, above all, the chivalrous gallantry and elegant courtesies of Moorish society found their way from Granada and Cordova to Provence and Languedoc. The half-savage French and German and English nobles imbibed the Arab admiration of the horse—they learned to pride themselves on skilful riding. Hunting and falconry became their fashionable pastimes. It was a scene of grandeur and gallantry, of tilts and tournaments. The refined society of Cordova prided itself in its politeness. A gay contagion also spread from the beautiful Moorish miscreants to their sisters beyond the mountains; the south of France was full of the witcheries of female fascination, and of dancing to the lute and mandolin. Even in Italy and Sicily the love-song became the favorite composition, and out of these genial but not orthodox beginnings the polite literature of modern Europe arose. The pleasant epidemic spread by degrees along every hill-side and valley. In monasteries, voices that had been vowed to celibacy might be heard carolling stanzas of which St. Jerome would hardly have approved; there was many a juicy abbot who could troll forth in jocund strains, like those of the merry sinners of Malaga and Xeres, the charms of women and wine, though one was forbidden to the Moslem, and one to the monk. The sedate greybeards of Cordova had already applied to the supreme judge to have the songs of the Spanish Jew, Abraham Ibn Sahel, prohibited, for there was not a youth, nor woman, nor child, who could not repeat them by heart. Their immoral tendency was a public scandal. At every house in the south

of France the wandering troubadour was a welcome guest. He sang 'ladye-love and war, romance and knightly worth.'**

Placed in the midst of these bewitching associations, the influences of Montpellier reached the less thoughtful classes of society. As if to illustrate the tendency, it was there that the first medical botanic garden in Europe was established. Science was nurtured among flowers. That garden continued until recent times, and for anything I know the vestiges of it may still remain. Its winding walks led through beds where all the herbs of the pharmacopœia were growing. In bowers of roses and cool grottoes of stone the Jewish doctor and his Moorish friend might discourse on the nature of diseases, and speculate on the modes of their cure.

We may estimate the power exercised by Montpellier from the action of the French Government. The University of Paris procured a decree prohibiting any Israelite from practising medicine in France; and at the time of the banishment of the Jews from that country, A.D. 1306, when Profatius, one of their persuasion, was Regent of the Montpellier Faculty, not one of the professors or doctors was spared. They were expelled under such circumstances of cruelty, that many of them died in the public roads.

I made the remark that the advice of physicians had often changed the current of human events. We have seen what their silent influence was, let us now look at an instance of their more open action.

* Draper's Intel. Develop. of Europe, p. 351.

Two Jewish doctors, Rabbi Abraham and Rabbi Joseph, came one day to King John II. of Portugal, representing that the continent of Africa could be sailed round. They had recently been to Egypt, and had brought with them an Arabic map of the African coast. Incited by this, the Portuguese monarch determined to make an attempt to double the Cape, in which they affirmed the African continent terminated at the south. A voyage in that direction is full of portents. The accustomed heavens seem to sink away at the north, and new stars are nightly approached. Vasco de Gama set sail in July, 1497, having with him the Arab map. King John had employed his Jewish physicians, Roderigo and Joseph, to devise what help they could from the stars. They applied the astrolabe to marine use, and constructed tables. These were the same doctors who had told him that Columbus would certainly succeed in reaching India, and advised him to send out a secret expedition in anticipation, which was actually done, though it failed through want of resolution in its captain. Encountering the usual difficulties, tempestuous weather, and a mutinous crew, who conspired to put him to death, De Gama at last succeeded in doubling the Cape and reaching India.

The consequences of this voyage were to the last degree important. The commercial arrangements of Europe were completely dislocated. Venice was deprived of her mercantile supremacy; prosperity left the Italian towns. Egypt, hitherto supposed to possess a pre-eminent advantage as offering the best road to India, suddenly lost her position; the commercial

monopolies, so long in the hands of the European Jews, were broken down. The discovery of America and passage of the Cape were the first steps of that prodigious maritime development soon exhibited by western Europe. And since commercial prosperity is forthwith followed by the production of men and concentration of wealth, and moreover implies an energetic intellectual condition, it appeared, before long, that the three cities of population, of wealth, of intellect, were shifting westwardly. The front of Europe was suddenly changed; the British islands, hitherto in a sequestered and eccentric position, were all at once put in the van of the new movement.

Now, considering the commercial and maritime development of the western European powers, is not this a striking instance of what a doctor's advice is worth? And yet I will give you a still more important example.

I have been offering you historical reminiscences of our profession from a point of view hitherto much neglected; and doubtless you have remarked how continually the Jew and the Arab have been presented in company. How was it that they came to be thus associated? how was it that they had so much to do with the early affairs of medicine?

We must go back through more than a thousand years to find an answer. In those days the world was thrown into consternation by the sudden attack of armies, which, mysteriously issuing from the sands of Arabia, a country until that time almost unnoticed and unknown, spread simultaneously and irresistibly to the east, the north, the west. Before their impe-

tuous assault, the decaying remains of Roman civilization could not stand. Religion, law, letters, art, all seemed to be in imminent danger of being remorselessly swept away.

Who was it that had been the cause, the main-spring of this prodigious movement? A man of contemplative habits, whose earlier life had been spent in the avocations of a merchant, his views enlarged by travel in foreign countries. Austere and abstemious, he gradually withdrew from the pursuit of gain, and became, in succession, a hermit, a preacher, a soldier. Of imposing personal presence, and in a country where manly beauty is common, reputed to excel in that particular, he had compelled his countrymen to accept his opinions, with all the truth and all the delusion they contained, in part by the eloquence of his tongue, in part by the more convincing argument of his sword. At first, in accordance with the destiny of his people, his hand was against every man, and every man's hand against him. He fought great battles, won great victories, successfully asserting his power as a law-giver, a conqueror, and master of men.

From campaigns that had ended in the overthrow and devastation of Western Asia, the Mohammedan armies prepared for the invasion of Africa, and resistlessly advancing, captured its metropolis, Alexandria. In that city was concentrated the literary wealth of the world. Its glorious relics of the old times they destroyed, and, it is affirmed, used the books of its vast libraries, the collections of a thousand years, for the purpose of kindling fires in the public baths.

To all human appearance there was the most imminent danger that a dominion of violence and ignorance would be instituted all over the world. The resistless barbarian hordes who were sweeping over Asia and Africa, and threatening Europe itself, had for their watchword, "Plunder in this world, and Paradise in the next." When all that civilized man values was on the very verge of destruction, when it seemed that nothing short of a miracle could be of any avail, some doctors of Alexandria dissipated the thunder cloud and made it descend in fertilizing showers.

I can only give you here a brief abstract of the curious circumstances under which this important result was brought about. You will find the details in Chapter XIII. of my recently published work on "the Intellectual Development of Europe."

There was an outcast Christian sect, the followers of one Nestorius, formerly Bishop of Constantinople, who with their leader had suffered the pains of excommunication for holding opinions, into the merits or demerits of which it is not worth while here to inquire. Of these people many were residents of Alexandria, and in the numerous Jewish population of that town found sympathy and friends. Among the educated Jews the profession of medicine had long been held in the most signal esteem, and on their part circumstances had made the Nestorians the depositary of the doctrines of the old Greek physicians.

The conquering Arab found among his vanquished enemies in these excommunicated Nestorians and outcast Jews, ideas resembling in some important respects those he was enforcing with his sword. He

condescended to take counsel with his victims, and—it is but a step from sympathy to admiration—he surrendered himself to their wisdom. So thorough was his conversion, that henceforth, as Humboldt has well remarked, he illustrated his power by his medical science. That impetuosity which had urged him through Asia and Africa, and far into Europe, now carried him into the domains of physical knowledge. He outstripped his teachers; from being a destroyer, he became the founder of modern science and modern industry. Our great manufactures, such as that of cotton, owe their origin to him. Wherever he went he established schools and colleges. Among very many others, the College of Salerno, of which we have spoken, was his work.

Will you excuse me in a momentary digression from my immediate topic? Among the events to which we are giving our attention, there is one that deserves the notice of physicians, one that here may well call forth their warning voice. What vestige is there now of the victories of Alexander the Great, what impress remains of the battles of Cæsar? Time has obliterated the deeds of those conquerors. Profound as their policy was, it was deficient in any element that could give it permanence. But how is it with the work of the Mohammedan captains? A thousand years have elapsed, and still it stands firm. The scimeter made, but Polygamy secured the conquest.

In Europe, for every 106 male births there are 100 female. Herein is a natural and unanswerable argument against Polygamy. But from another point of view, see what is its result! By the enormous fami-

lies it yields, it compresses into the space of a few years events that might have been spread over centuries. It makes a homogeneous, and therefore a powerful, and therefore a dangerous population. It can satisfy its necessities only at the expense of its neighbor, and by the extinction or extermination of his men. Its course is run in a geometrical progression. Considering how strong are human passions, how feeble is human control; considering the prodigious power this system soon gathers for itself, and how aggressive in its very nature it must be, a people who tolerate its establishment in their midst, tolerate a most dangerous foe. What is now going on silently and stealthily at the Great Salt Lake, in the heart of this continent, is fraught with evil to the future of the Republic.

From this digression, and from the earlier history of the medical profession, when its interests were in the keeping of those who were strangers in race, in manners, and in religion to us, let us turn to our own times. Let us consider how far we, as a class of the community, are performing our duty—how far we are imitating the good works of our predecessors, guiding public opinion, and enlarging public thought. It is the incident of our position that our influence is imperceptible. We have no grand organizations which, in an open, an avowed, an abrupt manner, can compel the attention and force the compliance of men. We can only now and then lift a corner of the curtain that conceals the light of Nature, and in the gleam that issues forth let the people who are sitting in darkness see who and where they are.

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Whence, then, I will ask, have arisen those noble ideas which are fast changing all modern philosophy, and working their way through descending ranks of society—ideas which have modified our conceptions of the world and of our relations to it? The scalpel, the microscope, the test tube, are the instruments that have furnished those ideas; the dissecting-room and laboratory are the places of their birth. We need not inquire in whose hand it is that such instruments are, nor who it is that frequents such places. The physician influences men by appealing to their understanding—he elevates by extending their sphere of thought. He presents Nature in her most attractive aspect, by offering her to our eyes in her proper position. He shows us our brotherhood to animated beings, rebuking our pride by teaching us how dependent we are, and that we are only a very insignificant portion of a very mighty plan. He points out to us, and what can be more worthy of our profound attention, that Chain of Life of which Aristotle in old times spoke. Man is its final link, and the unconscious, isolated cell that constitutes the primordial, the lowest plant, the first. It is anchored like a suspension bridge from the Realm of Matter to the Realm of Mind. It spans the gulf of infinite depth between them.

Our relation to the lower forms of organization is manifested not only by the present position we hold, as respects them, but also by the course of our previous life. We have not been set in our elevated post abruptly. It is the terminus of a journey we are making, or have made. We have passed through

a succession of typical forms, in a series continually ascending in complexity and value; and perhaps we may profitably meditate on the fact, that even at birth our life in this respect is almost over. And not we alone, but all other sentient beings. Their course is like our course. We all set out in the same car of life from the same point; we all take the same road, but travel to different distances. One comes to a stop after a little advance, another goes on farther; but man, destined for responsibility and immortality, completes his task to the end of the line. His fellow-passengers have dropped off at the way-side stations, here and there, to pursue their predetermined affairs in the positions at which they have arrived.

A large portion of my own life has been spent in the study of physical science, especially of chemistry, and this may perhaps be my excuse for continuing to present to you this aspect of nature. No one can devote himself to those pursuits without experiencing at once what might seem to be contradictory sentiments—pride and self-humiliation. Pride that it has been permitted to man to see so far as he does into the great scheme of the universe; humiliation in recognising how frail and insignificant he is.

What, then, are some of the latest truths that these physical senses teach? They show us how transitory, how dependent we are. There is a constant wear and tear of the human system. Particles that have served the purpose of forming it accomplish their office and die, and are replaced in due succes-

sion by others. In this respect life is the result of an aggregate of deaths. The atmospheric air into which all this dismissed material eventually finds its way, is thus the cemetery of animal substance, of things that have once been organized, but that have lost their force, and lapsed into an inorganic, a lifeless state.

From this inorganic, this lifeless state, such substances are destined to be recalled; for, under the influence of the rays of the sun, carbonic acid, and water, and ammonia are decomposed, and taking the products that arise from that operation, plants group them into organized portions again, and use them in the construction of their various parts, leaves, flowers, stems, fruits. Plants thus constitute the formative agents of the world of life. Animals are the destroyers. They organize; we consume. And thus it is that the same material oscillates back and forth, now a part of a plant, now a part of an animal, now in the air, and now in a plant again. It runs through cycle after cycle, ever returning to the point whence it set out, and ever setting out again.

We are not, then, the special or exclusive proprietors of the substance of which we are composed. Equally may the plant, and equally any animal, no matter how humble in the scale of life it may be, lay claim to it. We are bound to them and they to us by an indissoluble tie.

If that is the lesson we derive from our best knowledge of the mutations that happen to the plastic material which the hand of nature fashions into so many beautiful forms, we are brought to the same

conclusion by a consideration of the physical forces with which she invigorates it—the heat possessed by the different animal tribes, cold-blooded or hot, in their special degree, the chemical affinities and the electrical powers that preside over all the thousand combinations and decompositions perpetually occurring in the inmost recesses of the economy. “In a waterfall which maintains its place and appearance unchanged for many years, the constituent portions that have been precipitated headlong glide finally and for ever away. For the transitory matter to exhibit a permanent form, it is necessary that there should be a perpetual supply, and also a perpetual removal. So long as the jutting ledge over which the waters rush and the broken gulf below that receives them remain unchanged, the cataract presents the same appearance. But variations in them mould it into a new shape. Its color changes with a clear or a cloudy sky. The rainbow seen in its spray disappears when the beams of the sun are withdrawn. So in that collection of substance which constitutes an animal, whatever may be its position high or low in the realm of life, there is a perpetual introduction of new material, and a perpetual departure of the old. It is a form rather than an individual that we see. Its permanence depends altogether on the permanence of the external conditions. If they change, it also changes, and a new form is the result.”

An animal is, therefore, a form, through which material substance is visibly passing, and suffering transmutation into new products. In that act of

transmutation, force is disengaged. That which we call its life is the display of the manner in which the force thus disengaged is expended.

A scientific examination of animal life must include two primary facts. It must consider whence and in what manner the stream of material substance has been derived, in what manner and whither it passes away. And since force cannot be created from nothing, and is in its very nature indestructible, it must determine from what source that which is displayed by animals has been obtained, in what manner it is employed, and what disposal is made of it eventually.

The force thus expended is originally derived from the sun. Plants are the intermedium for its conveyance. For the sake of obtaining it, we use them as food. And here again remarks apply similar to those we have made respecting material substance. The correlation and conservation of force holds good. The assertion of the great Spanish Mohammedan, Averroes, is confirmed by all modern science, that the sum total of force in the world is ever the same, though it is parted among myriads of individuals, who draw from a common fountain their requisite supplies.

The body that we have to-day is not the body we had yesterday ; we shall change it again before to-morrow. In the course of a year a man requires a ton and a half of material—that is, nearly twenty times his own weight—to repair his wasting organs, and to discharge his vital functions. In that short space of time, the human family alone casts into the

atmosphere eighteen hundred millions of tons, and we are but a little fraction of the vast aggregate of animal life which all in its proper proportion is doing the same thing.

From Nature, which at this point of view presents us such an enchanting picture, let us turn to ourselves. Physiology rivals Natural Philosophy in the splendor and profound interest of its discoveries. We tremble on the brink of detecting the interior constitution of man. Will you hear me patiently while I give an example of what I mean?

No event has ever taken place in the world without spontaneously leaving a recoverable impression of itself.

The hand that wrote those words has cast its shadow on the paper. A century hence, if the paper should endure, that shadow might be made visible to the eye. But moralists say, "What is more transitory than a shadow?" They find in it an emblem of things of a fleeting nature. When the light, or the object that has obstructed it, is withdrawn, the shadow "fleeth away, and continueth not." A sundial that has been telling the hours of the day presents an unblemished surface when evening comes. Each morning it is ready for its task. The traces of the past seem all to have disappeared, but in truth they still exist, buried in the marble or the metal out of which the dial is made.

They who have visited the dark rooms of photographers know very well what I mean. The portraits of our friends, or landscape views, may be hidden, and invisible to the eye, but ready to make

their appearance as soon as proper means are resorted to, such as heat, or vapor of mercury, or sulphate of iron, or pyrogallic acid. Shadows are not such transitory things as men commonly suppose.

In the case of photography, we happen to know the proper means for development. The fact of chief interest to us is the imperishability of the primitive impression. A spectre is concealed on a silver or glassy surface, until by our necromancy we make it come forth into the visible world. Upon the walls of our most private apartments, where we think that the eye of intrusion is altogether shut out, and our retirement can never be profaned, there exist the vestiges of all our acts, silent but speaking silhouettes of whatever we have done. Can we say that among those phantoms there are not some on which we should be reluctant to have the cunning chemist try his art, and leave them, as the photographers say, fixed; some from which we should dread to hear the demand of the phantom of Endor, "Why hast thou disquieted me to bring me up?"

If men were sure that their most secret doings were at such a risk, would not the world be better than it is?

A sunbeam or a shadow cannot fall upon a surface, no matter of what material that surface is composed, without leaving upon it an indelible impression, an impression which may, by the subsequent application of proper chemical agents, be made visible. In many cases we have ascertained what the appropriate agent is; our failure in others is due to the imperfection of our knowledge, and not to any impossibility

in the operation. Time seems to have so little influence on these effects, that I can conceive it possible, if a new vault should hereafter be opened in the midst of an Egyptian pyramid, for us to conjure up the swarthy forms of the Pharaonic officials who were its last visitors, though forty centuries may have elapsed since their departure.

But let us see how these facts bear, in a most important manner, in the case of man.

If, after the eyelids have been closed for some time, as when we first awake in the morning, we suddenly and steadfastly gaze at a brightly-illuminated object, and then quickly close the lids again, a phantom image is perceived in the indefinite darkness before us. We may satisfy ourselves that this is not a fiction of the imagination, but a reality: for many details that we had not time to identify in the momentary glance, may be contemplated at our leisure in the phantom. We may thus make out the pattern of such an object as a lace curtain hanging in the window, or the branches of a tree beyond. By degrees the image becomes less and less distinct: in a minute or two, it has disappeared. It seems to have a tendency to float away in the vacancy before us. If we attempt to follow it by moving the eye-ball, it suddenly vanishes.

Now, the condition that regulates the vanishing of these phantom images on the retina is, that when they have declined in vigor to less than $1\cdot64$ th of the intensity they had while in presence of the object that formed them, they cease to disturb the sight. This principle is illustrated when a candle-flame is

held opposite to the sun, or any light having more than 64 times its own intrinsic brilliancy. It then ceases to be visible. The most exact of all known methods for measuring light—that by the extinction of shadows—is an application of the same principle.

But the great fact that concerns us is this. Such a duration of impressions on the retina of the eye demonstrates that the effect of external influences on nerve vesicles is not necessarily transitory. It may continue for a long time. In this there is a correspondence to the duration, the emergence, the extinction of impressions on photographic preparations. Thus I have seen landscapes and architectural views taken in Mexico, developed, as artists say, months subsequently—the images coming out after the long voyage in all their proper forms, and in all their proper contrast of light and shade. The photograph had forgotten nothing. It had equally preserved the contour of the everlasting mountains, and the passing smoke of a bandit fire.

Are there, then, contained in the brain more permanently, as in the retina more transiently, the vestiges of impressions that have been gathered by the sensory organs? Do these constitute the basis of memory—the mind contemplating such pictures of past things and events as have been committed to her custody? In her silent galleries are there hung micrographs of the living and the dead, of scenes that we have visited, of incidents in which we have borne a part? Are these abiding impressions mere signal marks, like the letters of a book, which impart ideas to the mind, or are they actual picture-images, incon-

ceivably smaller than those made for us by artists, in which, by the aid of a microscope, we can see, in a space not bigger than a pin-hole, a whole family group at a glance.

The phantom images of the retina, as I have remarked, are not perceptible to the light of day. Those that exist in the sensorium, in like manner, do not attract our attention so long as the sensory organs are in vigorous operation, and occupied in bringing new impressions in. But when those organs become weary and dull, or when we experience hours of great anxiety, or are in twilight reveries, or asleep, the latent apparitions have their vividness increased by the contrast, and obtrude themselves on the mind. For the same reason, they occupy us in the delirium of fevers, and doubtless also in the solemn moments of death. During a third part of our lives, we are withdrawn from external influences—hearing and sight and the other senses are inactive; but the never-sleeping mind, that pensive, that veiled enchantress,* in her mysterious retirement, looks over the ambrotypes she has collected—ambrotypes, for they are truly unfading impressions—and combining them together as they chance to occur, weaves from them a web of dreams.

Nature has thus introduced into our very organization a means of imparting to us suggestions on some of the most profound topics with which we can be concerned. It operates equally on the savage and on the civilized man, furnishing to both concep-

* *Odyssey*, Book x., l. 220-224.

tions of a world in which all is unsubstantial. "It marvellously extracts from vestiges of the impressions of the past overwhelming proofs of the reality of the future; and gathering its power from what might seem to be a most unlikely source, it insensibly leads us, no matter who or where we may be, to a profound belief in the immortal and imperishable, from phantoms that have scarcely made their appearance before they are ready to vanish away."*

There are those who blame modern science for its disposition to lean upon visible nature in its explanations of things. But when we see the fruits that that method of philosophy has yielded, when we contemplate the fair prospect it offers, are we not encouraged to continue? Why should we refuse our attention to the beauties and wonders that surround us on every side? Let us listen to the appeal of "The Minstrel:"

"O, how canst thou renounce the boundless store
Of charms that nature to her votary yields!
The warbling woodland, the resounding shore,
The gloom of groves, the garniture of fields;
All that the genial ray of morning gilds,
And all that echoes to the song of even,
All that the mountain's sheltering bosom shields,
And all the dread magnificence of heaven;
O, how canst thou renounce and hope to be forgiven!"

(*Beattie's Minstrel, Book I. Stanza LX.*)

What, now, is the principle that lies at the basis of these new and beautiful views of the world of organization, and of the relationship of the myriads of beings that compose it—views in the development of which modern physicians have taken a leading part?

* Draper's Physiology, p. 416.

It is the control of physical agents over the characteristics, the well-being, the very existence of living things. To this man himself offers no exception. His mode of life, his habits, are determined by them. Perhaps we can have no better illustration of this truth than in the few moments that remain this evening to look cursorily at ourselves. Physical agencies have moulded and are now determining the destinies of the American people.

We commonly affirm that we are devoted to agriculture. We count up the preponderating millions who spend their lives in that pursuit. We say that we are a producing nation. It is not so. Agriculture has never been practised in the United States. We are miners, not farmers.

Let me illustrate what I mean. We clear land, and put a new field in tobacco. In due season we send the produce to market. We put the same crop in the same land a second year; but if we try it a third or a fourth, we fail, for the tobacco will not grow.

How is this? The plant has exhausted the soil of one of its ingredients necessary to fertility—its potash. Now, in the absence of that substance, which is essential to its very constitution, it can no longer come to maturity. What, then, is the difference between the Virginian, who has been setting tobacco-plants to collect the potash from his land, and the Californian, who has been employing men to wash his soil for gold? Both have sold or sent to other countries the inorganic material that was their source of wealth. Both have impoverished their estates. Both are miners.

But the land is exhausted. What next? It will cost more than the whole produce has brought to put the potash back. Then restoration of the old fields is out of the question. New ones must be sought. What does that mean? Nomadic life.

If the estate is large enough, perhaps it may last the old planter's time. But, as his sons grow up, field after field is destroyed. Their eyes are set on untouched lands in the West. Why should they reverence or love the daily deteriorating spot? Their hopes are elsewhere. So, moral results of the profoundest kind are springing from the physical conditions.

Consider, now, what has been going on for the last two centuries along the whole Atlantic coast; for what I have said is only a forcible presentment of what has been going on everywhere. It holds good for the cotton, the wheat, the corn. From the shoreline there has been an onward march up the gentle incline of the continent. Strand after strand of fertile soil has yielded up its wealth. The front of the vast phalanx has already touched those regions where the rains are uncertain, and therefore the seasons unreliable. Beyond them is the untrodden desert. It were well if we all realized thoroughly that great fact!

There were, then, physical conditions of sufficient power to put an end to that period of tranquillity which our predecessors vainly imagined would be perpetual. There must be rivalries for the mastery of the promised lands of the West!

In the vast field of a new continent are number-

less paths for personal advancement. Unfettered by political restraint, a free career is, among us, offered to every one, and this, we are disposed to believe, is the greatest glory and chief advantage of our times. But good fortune is rarely experienced without some alloy; and we may profitably consider how far that intense Individualism, which is the inevitable issue of these conditions, and which characterizes our social state, is a public benefit—Individualism of which you see the consequences in every direction. “Each man for himself,” is a motto of which profound statesmanship can never approve. Its consequence is to make society a chaos of human atoms.

But that is repulsive to the very principles of modern civilization. Our ancestors, in the days when European society was emerging from barbarism, bequeathed to us no legacy of more value than the use of surnames to mark out families. On that—the family—the fair superstructure of Christendom rests.

If, now, we investigate the effects of the Individualism so characteristic of our times, do we not discover that it is beginning to touch this corner-stone of society? A greed of gain, a desire for personal independence, and emancipation from domestic control, invade the fireside and scatter the family. The homestead loses its attractions, the county and even the State cease to have any hold on the affections; nay, even the country itself is, by many, not weighed for a moment against their own transitory interests.

But here I must pause. The lesson we gather is

in conformity to the highest teachings of modern science. It is the absolute control exerted by physical conditions and natural agencies over the doings of men. Influences like these we have heretofore overlooked, but we can overlook them no more. They select our path, guide our steps, prescribe our destiny.

It is not to be wondered at that in thus asserting the control of nature over the well-being, and therefore over the acts of men, physicians should have taken the lead. Their pursuits instruct them to adopt that view of things. In this they follow the example of their greatest and earliest names. More than twenty centuries ago, Hippocrates advocated those great truths. No physician ever writes a prescription, no surgeon ever performs an operation, without tacitly adopting them; and it may be said that the unmistakable tendency of modern medicine is to find solutions of its problems and explanations of its difficulties in physical and natural principles.

From the first ages in which they obtained recognition as a distinct profession, or body, physicians have thus influenced public thought, both by precept and example. They have enlarged its sphere, and corrected its methods. They have been always in advance—never in the intellectual arrear of their times. On many occasions, when the future of the human race itself was a question, their ideas and acts have determined the event. Nor is their power in these days of increasing enlightenment on the decline; on the contrary, it is becoming stronger and stronger.

In the exercise of that influence, academies, such as ours, have duties of no little importance to discharge. Since their first establishment in Italy, at the period of the Renaissance, a great change has occurred in the modes of disseminating knowledge, due chiefly to the invention of printing. They have succeeded to the position once occupied by the universities. It is no longer from the chair of the professor, but at the session of the academy, that we seek for new additions to our knowledge. Learned societies have become the foci from which new discoveries and new inventions emanate. The universities have sunk to the attitude of mere schools.

It is for us, then, in our special sphere as physicians, to give what help we may to the investigation of nature, and especially to the investigation of the structure, the functions, the diseases of man. Our incitement should be not merely the intention of relieving the infirmities with which we are called upon to deal, but also that equally noble one of increasing the happiness of our race by increasing its knowledge. The world is growing old. You cannot guide it now, as was done a thousand years ago, by appealing to its feelings. You must address its understanding. It has learnt to appreciate not only the good and the beautiful, but also that which contains them both—the true. To satisfy its desires for that, is an occupation worthy of the time and exertions of us all.

